PROBLEM. Matrix of Strings (contributed by J. Beredo) [Score: 50/50]

As per the Mathematics definition, a matrix is an arrangement of numbers, symbols, or letters in rows and columns which is used in solving mathematical problems ¹. You can perform different types of operations with these groups of values. For this exam, we will be storing strings and performing operations on a **square matrix** - a matrix with the same row and column size.

To complete this exam, you are to implement five (5) functions that will allow your program to:

- 1. Accept string inputs given an input size then store to a 2D array (5 pts)
- 2. Transpose the string matrix and save to another array (5 pts)
- Store the reverse of all the string inputs (10 pts)
- 4. Copy all strings that are palindromes into a 1D array (15 pts)
- 5. Copy all strings with more vowels than consonants (15 pts)

TAKE NOTE: All display functions are called inside the main function.

Refer below for examples of expected results for the features indicated above. The examples are using a size of 3 (that is, 3 rows and 3 columns), but note that the input of the user for size can be at most 10 (equal to the defined constant SIZE).

TRANSPOSING

The transpose of the matrix is created by swapping the rows to columns or columns to rows. *Example:*

ORIGINAL STRINGS		
lynx	eve	andromeda
auriga	cygnus	civic
aquarius	aviva	hydra
TRANSPOSED MATRIX		
lynx	auriga	aquarius
eve	cygnus	aviva
andromeda	civic	hydra

REVERSING

For the reverse function in this problem, each string in the original matrix should be reversed.

Example:

ORIGINAL STRINGS andromeda lynx auriga cygnus civic aquarius aviva hydra REVERSED STRINGS xnyl ademordna eve agirua civic sungyc suirauga aviva ardyh

¹ https://www.collinsdictionary.com/dictionary/english/matrix

PALINDROMES

A *palindrome* is a word, sentence, verse, or even number that reads the same backward or forward. Assume the stored string only contains small letters (no special characters).

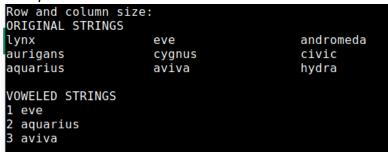
Example:

ORIGINAL STRI	NGS	
lynx	eve	andromeda
auriga	cygnus	civic
aquarius	aviva	hydra
PALINDROMES		
1 eve		
2 civic		
3 aviva		
TOTAL COUNT: 3	3	

VOWELED WORDS

Voweled words are those words having more vowels than consonants. Assume the stored string only contains small letters. In case of equal vowels and consonants, exclude the word.

Example:



EXAMPLE COMPLETE PROGRAM RUNS (assuming size input is 3 as in input.txt)

ORIGINAL STRINGS			Row and column size: ORIGINAL STRINGS	
lynx	eve	andromeda	mom	father
aurigans	cygnus	civic		
aquarius	aviva	hydra	uncle	auntie
TRANSPOSED MATRIX			TRANSPOSER MATRIX	
lynx	aurigans	aquarius	TRANSPOSED MATRIX	
eve	cygnus	aviva	mom	uncle
andromeda	civic	hydra	father	auntie
REVERSED STRINGS			raciici	ddirete
xnyl	eve	ademordna	REVERSED STRINGS	
snagirua	sungyc	civic	mom	rehtaf
suirauqa	aviva	ardyh		
DAL TAIDDOMES			elcnu	eitnua
PALINDROMES				
1 eve 2 civic			PALINDROMES	
3 aviva				
3 aviva			1 mom	
TOTAL COUNT: 3			TOTAL COUNT: 1	
VOWELED STRINGS				
1 eve			VOWEL ED CEDINGS	
2 aquarius			VOWELED STRINGS	
3 aviva			1 auntie	

To answer this programming problem, you are given the following seven (7) accompanying files:

- matrix.h the header file that contains the macro definitions and function prototypes that you need to define (complete) in LASTNAME-Matrix.c file (DO NOT CHANGE ANYTHING IN THIS FILE)
- LASTNAME-MATRIX.c the skeleton file where you will encode your functions
- main.c the C file containing main() function with function calls to the five functions you have to complete and display functions to show the results (DO NOT CHANGE ANYTHING IN THIS FILE)
- input.txt a text file containing a sample COMPLETE input
- Output.txt a text file containing the expected output of the program given the input.txt
- input2.txt second sample text file containing a sample COMPLETE input
- output2.txt second text file containing the expected output of the program given the input2.txt

RUN YOUR PROGRAM WITH INPUT and OUTPUT REDIRECTION:

Run your exe file in the command line with input redirection. You can store the result of your program into a text file by output redirection, For example, if **after compiling main.c**, you have the executable **prog.exe**, then you can run your executable program with output redirection as:

```
C:\CCPROG2> prog < input.txt > SANTOS-ACTUAL.txt
```

The output of the exe file will be stored in SANTOS-ACTUAL.txt file. A correct program using the input.txt for input redirection should produce the same set of values that are in output.txt provided.

TESTING & SCORING:

- Your program will be compiled via gcc -Wall, using C99 standard. Thus, for each function that does not compile successfully, the score for that function is 0.
- Your program will be tested by your instructor with other TEXT FILES (contents are different from the ones given to you) and with function calls of different parameter values.
- Full credit will be given for the function only if the student's implementation is all correct for all the test values used by the instructor during checking AND only if the student's implementation complied with the requirement and did not violate restrictions. Brute force solutions will not be given any credit. Deductions will be given if not all test cases produce correct results OR if restrictions were not followed.

DELIVERABLES:

Submit/upload two files via Canvas before the indicated deadline:

- 1. your LASTNAME-MATRIX.c source file
- your LASTNAME-ACTUAL.txt output text file

Don't forget to change the filenames to your own last name.